

# VLMCCs - The Torch-bearers of Community's march towards Disaster Management



# Why Are We Here Today

## We are here today because:

- We live in a place that falls in seismic zone V, making the occurrence of earthquakes a near certainty.
- We have a large network of rivers prone to flooding during almost every monsoon.
- Our landscape is changing with the process of economic development:
- Open spaces are shrinking with increased demand for land.
- Increased population needs more of community land for infrastructure and various other facilities, but availability of community land is diminishing.
- The green cover, including forest and non-forest areas is dwindling.
- Our wetlands are shrinking/disappearing.
- Our hills/hillocks are becoming unstable and landslide-prone for indiscriminate hill-cutting and human settlements on their slopes.
- And it is all contributing to the problem of the phenomenon called Climate Change.

# Why Are we here Today

- ❖ Process of economic development and modernisation is putting unsustainable pressure on our natural resources:
  - Construction of pucca and multi-storied houses are adding to the threat of greater damage to life and property by earthquakes.
  - Human settlement and farming in natural courses of rivers and water channels is worsening the flood scenario.
  - Construction of roads, railway lines etc. without due attention to the natural drainage systems are also adding to the threat of floods.
  - Deforestation is adding to the problem by increased desiltation of rivers and landslides.
  - Increased use of chemical fertilisers and pesticides are affecting soil health, air pollution and contamination of water.

# Why Are We Here

- All these factors contribute to the onset or severity of disasters.
- Some of us may be directly responsible for them, but all of us are silent partners to the creation or aggravation of the problems by remaining silent spectators.
- So, no natural disaster is a natural disaster in entirety.
- It is not possible to prevent all of them, but it is always possible to prevent some and mitigate their impact.
- Most effective response to a problem is always by those who face the problem upfront.
- It is the community, therefore, that has to refuse to be a silent spectator and assume the leadership to engage with the challenge of natural disasters.



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# We are here because.....

**We need to discuss and understand in the specific context of our village/ community:**

- **Why conservation of Natural Resources important?**
- **Why do we need to manage disasters?**
- **How do various natural and man-made disasters impact us and what kind of challenges they throw up?**
- **Are we fully prepared to prevent or mitigate, respond or provide relief and rehabilitation in case of any disaster?**

# We are here because.....

- Are we aware of the pollution of land, water, air around us?
- What can we do to address the issues related to conservation, disaster management etc. in our community?
- ❖ We are here to reinforce our will, reignite our passion and recharge our emotional and cognitive energy to seek out the best possible answers to the challenges we are faced with.

# VLMCC as the institutional face of the Community for Disaster Management

- ❑ Many a time we remain a silent spectator or are not able to contribute for the absence of an institutional mechanism to lend voice to our concerns and ideas.
- ❑ State Government created VLMCC as an Institutional mechanism for community's engagement with Disaster Management at the level where it matters most.
- ❑ It is envisaged as an instrumentality that facilitates dialogue within the community and also with the stake-holders outside the community.
- ❑ It is bottomed on the premise of active collaboration between the government and community to achieve common goals.



# Role & Responsibilities of VLMCC

- Guardian of the land and natural resources including the community land, open spaces, grazing lands, wetlands, hills and hillocks and ecological sites.
- Preparation of Village Master plan for Disaster Management that will include Village land bank and Village Knowledge Bank.
- Awareness generation on the importance of conservation of natural resources.
- Developing a sound understanding of factors contributing to or aggravating the impact of disasters.
- Building consensus on community-level action to address those factors.
- A pressure group on Disaster management Issues.



# Before the Earthquake Strikes



## Activity

## What to Do

Identification of vulnerabilities

- Vulnerable houses in the villages.
- Identification of vulnerable public buildings: schools, temples, mosque, community hall etc.
- Weaker sections of embankments, ramshackle bridges, sections of road vulnerable to landslide etc.
- Factories or industrial establishments using/producing poisonous gases, effluents etc.
- Identification of landslide prone areas, overhead HT lines, old and unstable trees etc.
- Identification of vulnerable category of persons: old and infirm, children, people with disability, mothers with infants, pregnant women etc.

## Activity

### Identification of resources

## What to Do

- Identification of safe buildings and open spaces that can be used as shelters.
- Information to be readily available about hospitals , fire stations, police station, army bases (if any), etc.
- Information on item available to be used for search and rescue; like, shovel, spade, iron chain, rope, Torch Light, Vehicle etc.
- Alternate routes for transportation.
- Alternative means of communication.
- Public-spirited youth agreeable to receive training on debris removal, search and rescue operations, attending to the critically injured persons and disposal of carcasses.
- Male and female members of the village to receive training on providing psycho-social support to the affected families.

## Activity

## What to Do

Knowledge sharing on the risk of earthquake.

- Discuss the issue in Gram Sabha meetings.
- Organise special meetings to share the Conversation Modules and Information Capsules.
- Organise debates, poster/pamphlet making competition in the schools on important days.
- Take out processions in the village involving school children and others.
- Encourage Youth Clubs and schools to perform street plays.

<b>Activity</b>	<b>What to Do</b>
Creating an environment of safer buildings.	<ul style="list-style-type: none"><li>▪ Whenever a public building (school, AWC, Sub-centre, PHC, Drinking water structure etc.) is being constructed in the village, do enquire if they are based on earthquake-resistance norms.</li><li>▪ See if the shelves, almiras etc. have been kept in a secure manner in schools and hospitals and corridors are not cluttered or obstructed.</li><li>▪ Ensure that no IAY house is constructed without a written intimation in Gram Sabha that earthquake-resistance norms are built into the design.</li><li>▪ Lodge formal protest with the Circle Officer and departmental authority concerned about an unsafe public building/structure.</li><li>▪ If a person is constructing a new pucca house, do advise him to get the design prepared/ checked by a competent structural engineer and keep a tab on the compliance with the advice.</li></ul>

<b>Activity</b>	<b>What to Do</b>
	<ul style="list-style-type: none"><li data-bbox="658 496 2004 708">■ Advise everyone not to make additions or projections in the existing buildings without verifying their strength to face earthquake.</li><li data-bbox="658 743 2004 879">■ Do take up with Gram Sabha to identify and notify unsafe buildings.</li><li data-bbox="658 914 2004 1198">■ In case of mud-walled or thatched houses, people should be advised to change and secure old pillars/posts and roof-supporting members etc.</li><li data-bbox="658 1233 2004 1374">■ Invite officials of PWD to share further information on safe building norms.</li></ul>



<b>Activity</b>	<b>What to Do</b>
What every person must know	<p>Flag following issues in regard to the personal safety in your knowledge sharing programmes:</p> <ul style="list-style-type: none"><li>■ Remember the basic principal: <b>Fix, fasten and forget.</b></li><li>■ Fasten all shelves securely to the walls.</li><li>■ Install shatter-safe window films to protect from breaking glass.</li><li>■ Use brackets to attach wall units, bookcases, and other tall furniture to wall studs.</li><li>■ Place large, heavy objects on lower shelves or on the floor. They might fall during an earthquake and the less distance they have to fall, the better.</li><li>■ You can also screw objects onto things, such as a desk.</li></ul>

<b>Activity</b>	<b>What to Do</b>
What every person must know	<ul style="list-style-type: none"><li>■ Use some non-slip mats to prevent heavy objects, or objects with a low centre of gravity, from sliding. For example, fish bowls, vases, floral arrangements, statues, etc.</li><li>■ Use an invisible nylon cord to secure tall, heavy items that can topple over to the wall.</li><li>■ Place an eye screw in the wall, and tie the thread around the object (such as a vase) and then tie it to the eye screw.</li><li>■ Place breakable items (bottles, glass, china, etc.) in closed cabinets that have latches. Lock or latch them up so that the cabinet doors cannot fly open.</li></ul>

<b>Activity</b>	<b>What to Do</b>
What every person must know	<ul style="list-style-type: none"><li>■ Use poster tack/plastic putty to keep ornaments, figurines, and glassware adhered to shelves and mantelpieces.</li><li>■ Heavy pictures, light fixtures, and mirrors should be hung away from beds, couches, and anywhere that someone might sit.</li><li>■ If you have any deep cracks in the ceiling or foundations, repair these immediately.</li><li>■ Evaluate your electrical wiring, electrical appliances, and gas connections. Do any repairs if needed. During an earthquake, faulty fittings and wiring can become a potential fire hazard.</li><li>■ Store flammable products in closed cabinets with latches on the bottom shelf.</li><li>■ Have flexible fittings placed on your gas pipes and on your water pipes.</li></ul>

Activity	What to Do
What every person must know	<ul style="list-style-type: none"><li>■ Always remember to have a clean desk with no items on. Remove everything from the desk that is dangerous such as a knife or scissor after they are used.</li><li>■ Teach everyone in your household to use emergency whistles and/or to knock three times repeatedly if trapped.</li><li>■ Decide on a rallying point for your family for after the earthquake. It should be away from buildings.</li><li>■ Go over what your family should do in the event that not everyone makes it to the rallying point.</li><li>■ Identify an out-of-area contact person that your family can call and get in touch with one another.</li><li>■ Creating a family reunion point is sensible</li></ul>

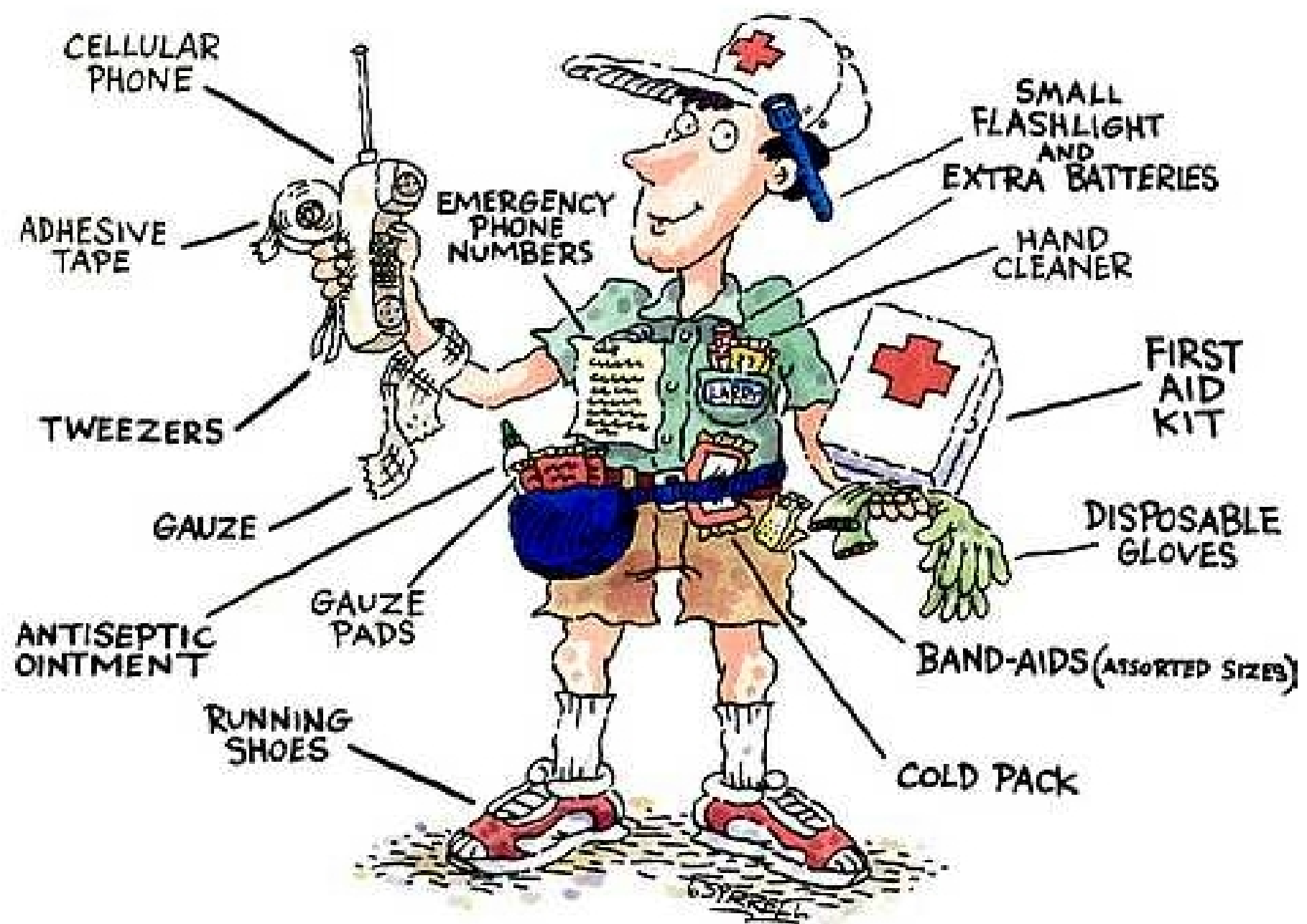
<b>Activity</b>	<b>What to Do</b>
What every person must know	<ul style="list-style-type: none"><li>■ Familiarise yourself with the main switch of the electrical wiring in the house.</li><li>■ Familiarise yourself with the main switch of the gas pipeline.</li><li>■ Keep a First- aid kit readily available in the house.</li><li>■ Don't forget the safety of the cattle not free to run away.</li><li>■ Create a Disaster Preparedness Plan incorporating all the points mentioned above and go over it on a regular basis.</li></ul>

Activity	What to Do
Maintaining the Emergency Response Kit	<ul style="list-style-type: none"><li>■ Have an Emergency Response Kit ready with at least the following items:<ul style="list-style-type: none"><li>✓ Food (Dry / Ready-to-eat) like Chira, Pitha guri, Chattu, etc. sufficient for at least three days.</li><li>✓ <b>Drinking Water Bottle</b></li><li>✓ Baby food for infants</li><li>✓ <b>Whistle</b></li><li>✓ Battery operated: Radio &amp; Torch light</li><li>✓ <b>Spare batteries</b></li><li>✓ Matchbox / lighter and candles</li><li>✓ <b>Small knife</b></li><li>✓ Nylon rope</li><li>✓ <b>First aid kit</b> (Cotton, clean cloth, bandage, antiseptic cream, scissor, ORS packets, etc.)</li></ul></li></ul>

Activity	What to Do
What every person must know	<ul style="list-style-type: none"><li>✓ Prescription medicines if needed by any family member</li><li>✓ Spare eye-glasses</li><li>✓ One set of cloths for each member</li><li>✓ Soaps and personal sanitary items for health &amp; hygiene.</li><li>✓ Xerox copy of important documents in a plastic pouch</li><li>✓ Important Phone Nos viz. police station, hospital, Circle Officer, BDO, etc.</li><li>✓ Utensils (Plates – 2, Glasses -2, Food Bowls – 2, etc.)</li></ul>

Activity	What to Do
What every person must know	<ul style="list-style-type: none"><li>✓ Polythene sheet (6 ft x 6 ft – 2 sets)</li><li>✓ Blankets (one or two) in winter season</li><li>✓ <b>Note:</b></li><li>✓ All these items may be kept in a 15 litres covered bucket / container which may be used for carrying / storing water</li><li>✓ All the family members should be aware of this</li><li>✓ Emergency Kit items should be checked / changed at appropriate intervals</li></ul>





CELLULAR PHONE

ADHESIVE TAPE

TWEEZERS

GAUZE

ANTISEPTIC OINTMENT

RUNNING SHOES

EMERGENCY PHONE NUMBERS

SMALL FLASHLIGHT AND EXTRA BATTERIES

HAND CLEANER

FIRST AID KIT

DISPOSABLE GLOVES

BAND-AIDS (ASSORTED SIZES)

COLD PACK

GAUZE PADS

STRELL

Activity	What to do
Be the voice of the Community	<ul style="list-style-type: none"><li>▪ The first contact person for the VLMCC is obviously the Circle Officer and all the resolutions should be sent to him/her.</li><li>▪ Take up following issues with the Government Departments by sending resolutions or by inviting the representatives to the village:<ul style="list-style-type: none"><li>➤ Weak and vulnerable public buildings – Department concerned.</li><li>➤ Weak embankment – E.E., WRD.</li><li>➤ Weak bridges and sections of roads prone to landslide – PWD (R).</li></ul></li></ul>

<b>Activity</b>	<b>How and when to do</b>
Be the voice of the Community	<ul style="list-style-type: none"><li>➤ Unstable Hill slopes and hill-cutting, quarrying or mining - Deputy Commissioner/ SDO ( C)/ DFO (T).</li><li>➤ Facilities for treatment for head injuries, fracture, availability of ambulance, stretcher etc. – SDMHO/In-charge, PHC.</li><li>➤ Unstable electric poles/ power lines over settlements or vulnerable to landslide – E. E., Power Department.</li><li>➤ Safety measures taken by Industrial establishment regarding the danger of poisonous gas leaks or effluent discharge.</li><li>▪ Learn to use the RTI Act to get information about critical areas of interest.</li></ul>

# When Earthquake strikes



Activity	What to Do
What every person must know	<ul style="list-style-type: none"><li>➤ Never use the lift / elevators</li><li>➤ If you are living in a <i>kutchra</i> house, the best thing to do is to move to an open area where there are no trees, electric or telephone wires.</li></ul> <p><i>During quake:</i></p> <ul style="list-style-type: none"><li>➤ - Remain calm !</li></ul> <p><i>If inside</i></p> <ul style="list-style-type: none"><li>➤ Stay inside: <b>“DROP, COVER and HOLD!”</b> Drop under sturdy furniture. Cover as much of your head and upper body as you can. Hold the furniture.</li><li>➤ If you cannot get under sturdy furniture, move to an inside wall or archway and sit bringing knees to your chest and cover your head.</li><li>➤ Move away from windows, mirrors, bookcases and other unsecured heavy objects</li><li>➤ If you are in bed, stay there and cover yourself with pillows and blankets.</li></ul>

Activity	How and when to do
What every person must know	<p><b><i>If outdoors:</i></b></p> <p>Move into the open, away from buildings, streetlights, and utility wires till the quake stops.</p> <p>Avoid places where there are loose electrical wires and do not touch metal objects that are in touch with the loose wires.</p> <p>There may be earthquake – triggered landslide, so avoid foothill locations after an earthquake</p> <p><b><i>If in a moving vehicle:</i></b></p> <p>Stop in an open area away from all structures especially bridges, over passes, tunnels, overhead power lines.</p> <p>Stay inside the vehicle.</p> <p>Avoid bridges or ramps as that might have been damaged by the quake.</p>

Activity	How and when to do
What every person must know	<p data-bbox="600 288 931 331"><i>After the quake:</i></p> <ul data-bbox="703 347 2022 1353" style="list-style-type: none"><li data-bbox="703 347 2022 564">✓ Be prepared for aftershocks. Though usually less intense, aftershocks may also cause additional damages and bring down weakened structures.</li><li data-bbox="703 596 2022 734">✓ If you are trapped under debris, make noise for rescuers to hear you.</li><li data-bbox="703 766 2022 903">✓ Ensure your own safety and then help injured or trapped persons.</li><li data-bbox="703 935 2022 1072">✓ Listen to a radio for the latest emergency information.</li><li data-bbox="703 1104 2022 1168">✓ Stay out of damaged buildings / houses.</li><li data-bbox="703 1200 2022 1264">✓ Return home only when authorities say it is safe.</li><li data-bbox="703 1295 2022 1353">✓ Use telephone for emergency calls only.</li></ul>

Activity	How and when to do
Planning and executing immediate response.	<ul style="list-style-type: none"><li>❖ Don't panic or get depressed. Situation might be even worse.</li><li>❖ Try to contact the DEOC or SEOC immediately to share the first-hand information on the scenario.</li><li>❖ Landline or mobile phone may no work. Share information by deputing someone to the nearest HF/VHF facility. It may be Revenue Circle Office or the Police Station.</li><li>❖ Don't feel frustrated or let down for delay in response from outside. Many others may be in greater need of help.</li><li>❖ It is necessary to avoid chaos and confusion in the task of search and rescue operation.</li><li>❖ Mobilise the Quick Action Teams of trained persons and apportion areas of responsibility for the search and rescue operation.</li></ul>



Activity	How and when to do
Planning and executing immediate response.	<ul style="list-style-type: none"><li>❖ Quick Action Teams should be functionally deployed:<ul style="list-style-type: none"><li>• Helping the trapped persons out – cases with the prospect of better chances of rescue to be attended first.</li><li>• Carrying the injured to safe places.</li><li>• Carrying the persons-in-need-of help, like old and infirm, physically challenged, pregnant women and women with infants etc., to safe places.</li><li>• Providing First Aid.</li><li>• Setting up temporary shelters by arranging drinking water and other essential items.</li><li>• Clearing roads by removing fallen trees, debris, electric poles etc. to restore connectivity.</li><li>• Carrying critically injured to the nearest hospital/health centre.</li></ul></li><li>❖ Make a quick head count and prepare a list of missing persons.</li><li>❖ Remain in touch with the authorities through DEOC , SEOC and to other Emergency Helpline Numbers.</li></ul>

Activity	How and when to do
Clear debris to reach out to trapped victims.	<ul style="list-style-type: none"><li data-bbox="607 293 1989 427">❖ Handle debris removal carefully not to cause further injury to the trapped persons.</li><li data-bbox="607 480 1989 687">❖ It is essential to give hope and confidence to the trapped persons while the process of debris removal is on.</li><li data-bbox="607 740 1989 1182">❖ Share the correct assessment and don't exaggerate the damage caused with the SDRF and PWD (B) officials to help them mobilise the search and rescue equipment and teams. Cut the trees with available equipments and remove it as far as possible.</li><li data-bbox="607 1235 1989 1374">❖ Cooperate with the search and rescue teams and avoid indulging in blame game.</li></ul>

# Preparing for Floods



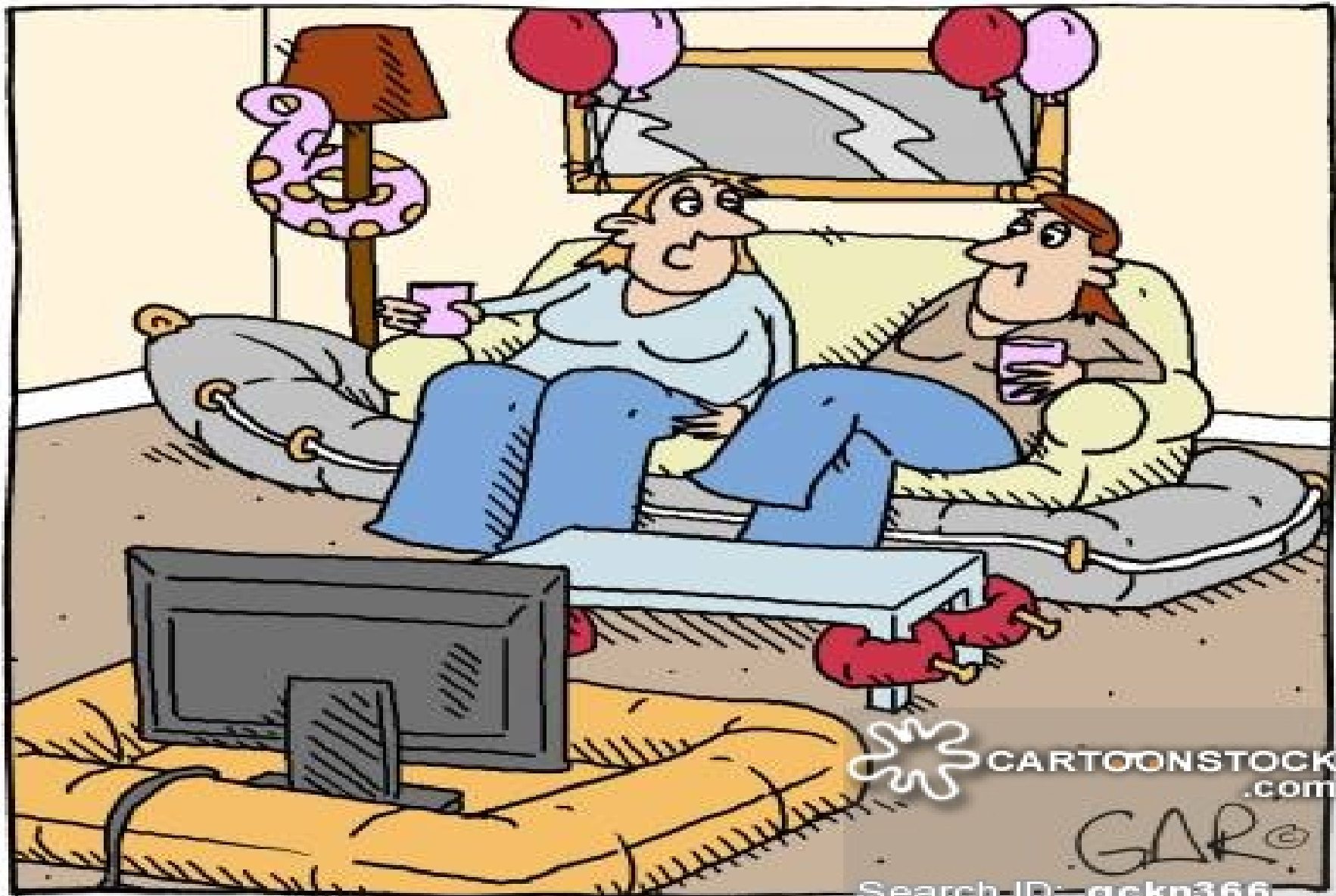
# What VLMCC should Do

- Discuss the history of floods in the village to find out what went wrong in responding to the threat at the community level and by the government agencies.
- Familiarise yourself with the Flood Hazard Atlas prepared by the ISRO showing the vulnerability of the village.
- Consult the report prepared by the water resources department on the vulnerable sections of the embankment and share your own assessment of the same with them.
- Make an assessment of the houses constructed by encroaching on the natural course or normal floodplain of the river.
- Make an assessment of the houses in lower areas prone to waterlogging or flooding.
- Update the list of vulnerable sections of population prepared for facing flood.



# What VLMCC should Do

- ❑ Prepare and keep updating the inventory of items that may be helpful in facing floods.
- ❑ These include boats, ropes, tents, tarpaulin, torch light etc.
- ❑ Identify and prepare the list of useful human resources, including persons with good swimming and diving skills, persons with knowledge of carpentry, persons who can help in administering first aid etc.
- ❑ Update contact details of the SEOC, DEOC, Circle Office and other numbers dedicated to emergency management.
- ❑ Familiarise yourself with the places/sites/buildings identified to be used for temporary shelter or Relief Camps or for keeping the cattle during floods.
- ❑ Familiarise yourself with the places earmarked for the disposal of carcass.



“...so we decided to put in our own flood protection scheme.”

# What VLMCC should Do

- Drinking water, sanitation facility, food , fodder and medicines are the critical necessities for the flood-affected people.
- Make an assessment of the stocks and resources available with the community and village level organisations and familiarise yourself with the arrangements made by the government departments.
- Organise training for the villagers with the help of line departments on purifying river water to be used for drinking purposes, making temporary low-cost latrines, and medicines for common diseases.
- Take stock of the problems in connectivity faced during the worst case scenario and report the weak bridges, poor approaches to bridges, non-availability of drainage facility or bypasses for the roads prone to waterlogging or flooding.
- Identify alternative routes to be used if main arteries of connectivity get disrupted.
- Identify persons who can be used to send information to the authorities if communication channels of landline or mobile phone do not work.





In an **EMERGENCY** seconds count!  
Do you know what to do?

# What VLMCC should Do

- ❑ Form Quick Response Teams with village level volunteers for effective response to the challenges in the same manner as for the earthquake. Such Teams may be formed for:
  - Rescuing and carrying the persons to safer places.
  - Helping vulnerable sections of population in evacuation.
  - Carrying the cattle to safer places.
  - Providing first aid.
  - Carrying seriously ill persons to hospitals/Health Centres.
  - Setting up temporary shelters/camps.
  - Disposal of dead bodies and carcasses.

# What VLMCC should Do

- ❑ It is essential to know the duties and responsibilities of various government departments to demand services from them. Familiarise yourself with the provisions contained in Assam Disaster Management Manual in this regard.
- ❑ Also familiarise yourself with the SDRF guidelines for financial assistance to the affected persons.
- ❑ Awareness generation should be an ongoing activity and be intensified during pre-monsoon period.

# Working with Government Departments

- ❑ Food security is a critical issue for the perennially flood-affected areas. It can be assured by growing appropriate flood-resistant and short-duration varieties of crops and altering the cropping pattern suitably.
- ❑ Ask **Agriculture Department** to provide training and input support.
- ❑ **Agriculture department** is also required to raise nurseries and have some sufficient supply of seed and saplings to help farmers cope with the crop damages caused by floods.
- ❑ Ask for information on arrangements made and norms laid down in this regard.
- ❑ Permanent solution to the drinking water problem lies in construction of dug-wells or providing hand-pumps in a manner that they don't get submerged during floods.
- ❑ It is also essential to design Running water Supply schemes in a manner that they remain functional during flood season.
- ❑ Take up the matter with **PHE Department**.

# Working with Government Departments

- Sanitation related problems become a nightmare during floods. Innovative designs of latrines need to be introduced.
- Ask **PHE Department** what their plans are in this regard.
- Construction of houses in flood-prone areas also need to be adapted to the ground reality.
- Ask **P. & R. D. Department and PWD (B)** how they can help the villagers.
- Blocking and chocking of natural drainage systems and encroachment on wetlands adds to the severity of floods.
- Ask **Water Resources Department** to clear the natural drainage systems and **Circle officer** to remove encroachment on all wetlands.

# Working with Government Departments

- It is the responsibility of the **Education and H.& F.W. Departments** to construct schools and hospitals in safer and high-land areas with proper approach roads.
- Take up with these departments to take remedial measures.
- Keeping surplus stock of food grains is the responsibility of **Food and Civil Supplies Department**. Get information from them about the stock maintained.
- Ask **A.H & Veterinary Department** about the plans to ensure adequate provision of fodder and medicines for the cattle.
- Approach **SDRF through the Circle Officer** for conducting mock drills and training volunteers in diving and other rescue skills.
- Impact of floods on soil health can both be beneficial and harmful. **Soil Conservation Department** is required to make an assessment of the soil health and its impact on the productivity of the land.
- Ask the department to share its findings about the soil health and steps planned to restore it.

During Floods

# During floods

- ❑ Floods may strike in four forms: Low floods, High floods, Sudden flooding due to breach in embankment or unannounced release of water from dams, and Flash floods due to heavy downpour in the upper reaches.
- ❑ Following steps should be taken:
  - Share/disseminate the warning/information received from confirmed sources with optimum speed.
  - Mobilise the Quick response teams to evacuate and carry people to temporary shelters/relief camps.
  - Get in touch with the authorities for assistance through DEOC, SEOC or other Helpline numbers.
  - Take other measures as discussed in respect of coping with the earthquakes.
  - Beware of rumours and don't disseminate exaggerated reports of threat or damage.



# After Floods

# Damage Assessment



# Damage Assessment

- ❑ SDRF provides for financial assistance to the NOK of those who lost their lives and to the affected persons for damaged houses, crop loss, damage to agricultural fields, loss of cattle, restoration of damaged infrastructure like roads, embankments, schools, AWCs etc.
- ❑ Familiarise yourself with the SDRF guidelines to be able to keep a tab on the Damage Assessment exercise being carried out by the Government officials.
- ❑ Maximum problems are faced in the reports regarding land affected by siltation, input subsidy against damaged crops and loss of large and small cattle.
- ❑ To ensure authenticity of figures, cooperate with the Agriculture and Veterinary department officials in preparing the report.
- ❑ Ensure that photographs of the affected persons claiming financial assistance and damaged assets are taken at the time of damage assessment exercise.
- ❑ Insist that the damage assessment report is shared with the villagers in an open meeting before it is sent to the Government.
- ❑ Report the instances of under-reporting or over-reporting to the Circle Officer immediately.

# COPING WITH LANDSLIDES

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ELECTORAL LANDSLIDE...

# Before Landslides occur

## Identification of weak hills/hillocks:

- Discuss the history of changes having occurred in the face of hill/hillock.
- What makes the hills/hillocks dangerous is the instability of slopes.
- Unstable slopes are caused by various factors like, deforestation in the upper areas of the hills, removal of vegetation from the slopes, formation of gullies, unplanned agricultural activities, human settlements on the slopes, hill-cutting or quarrying.
- These activities lead to the loosening of soil and rock formations and causes the materials to hurtle down during heavy rains and earthquake.
- ❖ Mere observance of the pattern of changes will enable you to understand the seriousness of the problem and areas under threat.

# Before Landslides occur

- ❖ Make an assessment of the disturbing factors:
  - unabated encroachment on the hill slopes and in the foot-hills;
  - presence of Communication Towers or electric poles on the slopes;
  - construction of public buildings like schools, hospitals etc. in the foothills;
  - blocking of natural drains and construction of roads/pathways without proper protection and drainage facility.
- ❖ Approach DDMA through Circle Officer to organise discussion with the officials of Soil Conservation, Forest and Mines and Geology Departments for sensitisation of the villagers.
- ❖ Request DDMA to put up a signboard at all the sites identified as vulnerable to landslides.

# Before Landslides Occur

- ❖ Send resolution to the Deputy Commissioner through Circle Officer to remove unauthorised encroachment on the hill slopes and in foot-hills.
- ❖ Organise meetings with the families having their house in foothills or areas likely to be affected regarding the caution to be observed.
- ❖ Organise peaceful protest against deforestation and hill-cutting.
- ❖ Ask for removal of public buildings, electric poles, towers etc. from the areas likely to be affected.

# Before Landslides Occur

- ❖ Quick Response team for debris removal should be of help in carrying out rescue operation, but equipment like, JCB/Dumpers, Axe/Cutters , Generator, Ladder etc. will be needed to deal with heavy landslide.
- ❖ Have the contact details of the officials to be approached for immediate help.
- ❖ Organise pre-monsoon meetings with departmental officials concerned for better preparedness.
- ❖ Take up awareness generation drives on the lines discussed for coping with earthquakes and floods.





## Some Important Protective Measures

- ❖ Important protective and remedial measures include:
  - Plantation of slopes.
  - Reinforced-earth retaining walls and terrace walls
  - Retaining walls of rock-filled wire baskets (gabions).
  - Rock buttresses placed at the toe of a potential slide area.
  - Installing horizontal drains.
  - Using pumping wells.

## Some Important Protective measures

- In areas where rock-fall could happen or rocks could break out of the soil it is useful to nail an iron mesh into the ground covering the straw layer.
- Very steep eroded slopes with compact soil can be secured with a live slope grid.
- Live wooden crib-walls are one of the best methods to securing immediately endangered parts of slopes and toes of slopes.
- Vegetated stone walls and vegetated gabions.

# When landslide Occurs

- ❖ Two types of people are affected by landslides: those living in the vicinity and commuters passing through the affected site.
- ❖ Immediate task will be to help people move away from the area and shift to safer places.
- ❖ Incident should be reported immediately to DEOC for deployment of SDRF and rescue teams from PWD.
- ❖ Majority of affected people will have fractures or head injuries needing immediate medical attention. Nearest PHC should be informed to send mobile medical team and ambulances.

## When landslides Occur

- ❖ Family members of the commuters caught in the landslide should be informed.
- ❖ Quick Response teams of village volunteers should be pressed into service for providing first aid, setting up relief camps etc.
- ❖ Protocol for damage assessment should be followed as in case of floods and earthquake.
- ❖ The experience should be documented and shared with the government departments for taking up necessary preventive measures.

# Operationalising Relief and Recovery Efforts



**DISASTER RELIEF**

# Setting up Relief camps

- ❖ Government is committed to provide relief to the affected population and Assam Disaster Management Manual provides for setting up of Relief Camps until people are not able to return to their houses.
- ❖ State Disaster Resource Fund prescribes norms for providing relief to the affected persons.
- ❖ Familiarise yourself with the Assam Disaster Management Manual and SDRF guidelines for effective oversight on the relief management.

# Setting up Relief camps

- ❖ Important points to know about Relief camps:
  - Every Relief Camp has to have an in-charge who shall maintain the complete record of the inmates category-wise (Male-Female, infant, Children below six year, physically challenged persons, pregnant mothers, old person).
  - Relief Camp should have separate lodging facility for men and women.
  - There shall be separate bathing and sanitation facilities for men and women.
  - Availability of safe drinking water should be ensured.
  - Cooked food or food grains shall be provided as per SDRF guidelines.
  - Special food should be provided to the infants and children below six years.



# Setting up Relief Camps

- ❖ The ANM and AWWs of the affected villages should stay at the camp and take care of the children and persons in need of help.
- ❖ School teachers of the affected villages shall conduct classes in the camp itself.
- ❖ Medical team should visit the camps at regular intervals and arrangement should be there to shift the sick persons or pregnant mothers to the hospital.
- ❖ Bank account of all the inmates eligible to receive financial assistance under SDRF guidelines shall be opened, if not done already, at the camp itself by organising a special drive.
- ❖ Proper record of the assistance received from both Government and voluntary organisations should be kept.
- ❖ A status report should be sent by the camp in-charge every day.
- ❖ VLMCC is expected to maintain a close vigil on the process and help with its knowledge of affected persons and local

# Setting up Relief camps

- ❖ It is the responsibility of the government to set up relief camps, but you can help by:
  - Sharing authentic information of the dead, injured and missing.
  - Identifying the affected families and making a list of the camp inmates.
  - Mobilising locally available resources to meet urgent requirement of firewood, kitchen utensils, materials for temporary partition to ensure privacy for female inmates, vegetables or other agricultural produce etc.
  - Extending a helping hand in distribution of relief.
  - Providing psycho-social support and emotional healing support to the inmates.
  - Ensuring optimum transparency in the management of relief camps.

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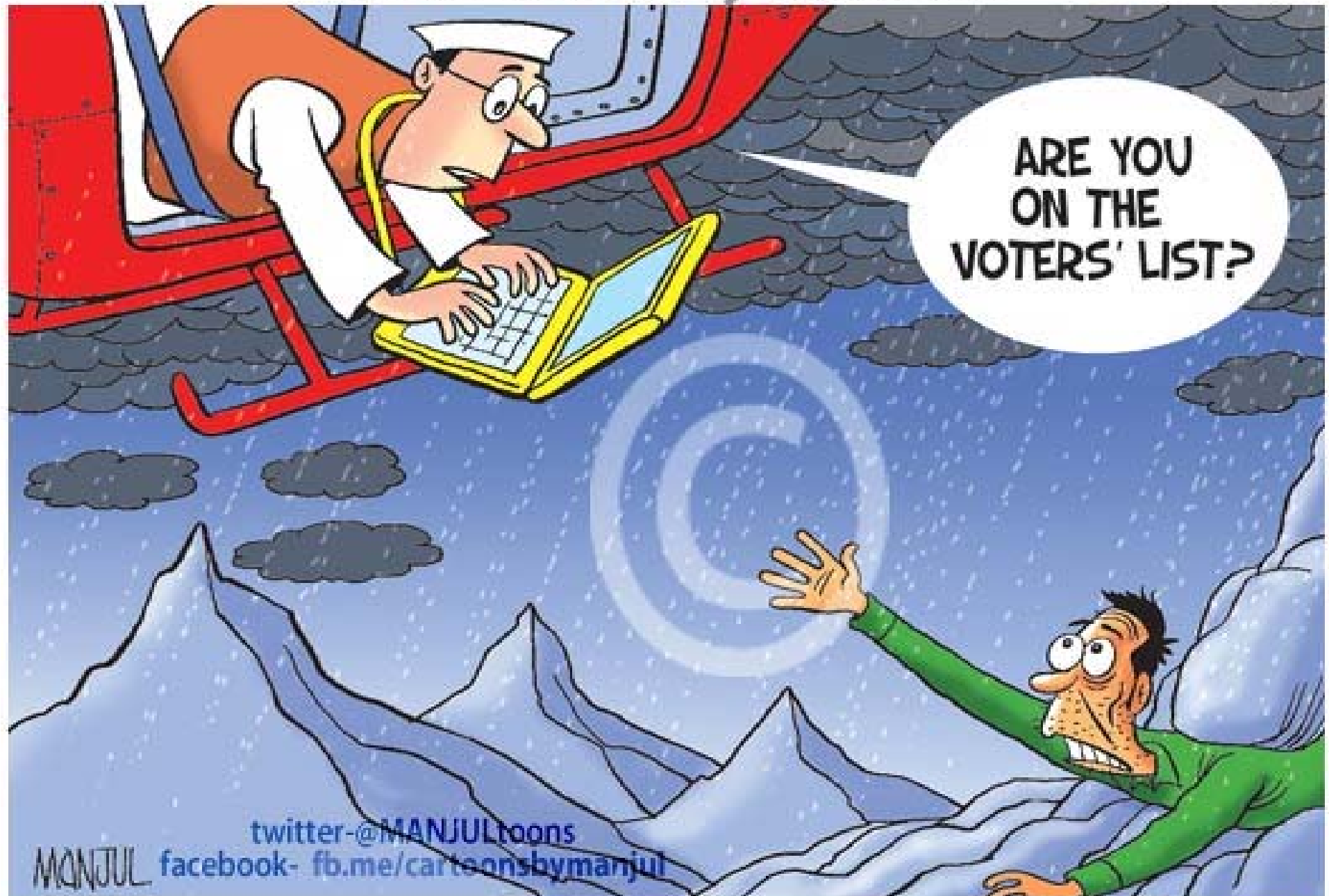


The last one is  
for the local  
administration.

# Damage Assessment

- ❖ It is critical to assess the damage to the life and property correctly for assisting the affected person in the recovery process.
- ❖ You can help by:
  - Asking villagers to be present on the day of the visit of the Damage Assessment Team.
  - Helping the Team in identifying the affected persons.
  - Leading the Team to the sites of damage.
- ❖ Do verify the report prepared by the team of Government officials to ensure that it mirrors the ground reality.
- ❖ Bring the instances of under-reporting and over-reporting to the Circle Officer and D.C/S.D.O. through DEOC or written resolution of the Committee.
- ❖ Raise your voice against delay in damage assessment.

# POLITICKLE by MANJUL



# Taking care of the cattle

- ❖ Ensure that the cattle that are not free to move are made free to move away.
- ❖ Temporary sheds should be constructed for them with proper feeding arrangement.
- ❖ A.H & Veterinary department Officials should immediately be contacted to share the information of the dead and injured animals and requirement of fodder.
- ❖ Carcass disposal is of prime importance for healthy and hygienic environment.
- ❖ Do report delay in or deficiencies in the treatment of the injured cattle or disposal of the dead.

# Ensuring Early and Effective Recovery

- Keep close vigil on the recovery and restoration efforts.
- Report the instances of delay in disbursement of financial assistance.
- Do report instances of shoddy quality of restoration works.
- Organise brainstorming on the problems faced and response to the problem to identify the areas of action to improve preparedness for the future.
- Every VLMCC should come out with a consolidated report on the road-map for the future.

# Protecting Our water Resources





# Facts to know about Ground water Management

- Assam is largely a rain-fed state.
- It is essential for rain-fed areas to optimise the water productivity by efficient management of both surface and ground water.
- Groundwater, which is in aquifers below the surface of the Earth, is one of the Nation's most important natural resources.
- More than 60% of irrigated agriculture and 85% of drinking water supplies are dependent on groundwater.
- We estimate that nearly 700 million Indians who live in Indian villages, almost entirely depend upon groundwater for their daily needs.

# Facts to Know about Ground water Management

- Groundwater acts a critical buffer against the variability of monsoon rains.
- Farms irrigated with groundwater have twice the crop water productivity of those that rely on surface-water alone. This is largely because the resource allows farmers greater control over when to irrigate their fields and how much water to use each time.
- An increasing number of aquifers are reaching unsustainable levels of exploitation. If current trends continue, in 20 years about 60% of all India's aquifers will be in a critical condition says a World Bank report,
- This will have serious implications for the sustainability of agriculture, long-term food security, livelihoods, and economic growth.

# Facts to know about Ground Water Management

- ❖ The 'protocols' of groundwater management include:
  - strategies of groundwater recharge and protection as part of watershed development;
  - protection of natural recharge areas,;
  - efficient well-use;
  - regulating energy (particularly pump capacities),;
  - determining the distance between wells and well-depths,;
  - crop water management .
- ❖ There is a need to involve community in enforcing these protocols through a well-designed training programme.

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# Facts to Know about Ground water Management

- Groundwater use in India has led to multiple impacts, the most obvious being fall in water levels and reduced well-yields. With users having to pump water from greater depths, costs of deepening and drilling have been further compounded by the need to install high-capacity pump-sets.
- Ground water contamination has emerged as one of the fall-outs of groundwater overexploitation in India.
- It is estimated that out of 593 districts from which data is available, we have problems from high Fluoride in 203 districts, Iron in 206 districts, Salinity in 137 districts, Nitrate in 109 districts and Arsenic in 35 districts.

# Facts to know about Surface water Management

- ❖ Surface Water Management is equally important; not only to reduce the pressure on Ground Water, but also to recharge the Ground Water.
- ❖ Encroachment on the water area and siltation are major problems for surface water harvesting structures .
- ❖ VLMCC can make a major contribution by protecting the Wetlands, maintaining wells in a good condition, and creating rain-water harvesting structures.
- ❖ VLMCCs can work with Water Users Associations to build up consensus amongst the community about water use prioritisation, water use norms, access, pricing, maintenance and so on.
- ❖ Based on this consensus it should work out a water use plan for the available resources.
- ❖ A shining example of participatory water management is the Barefoot Hydrologists in Andhra Pradesh.

# Facts to Know about Surface water Management

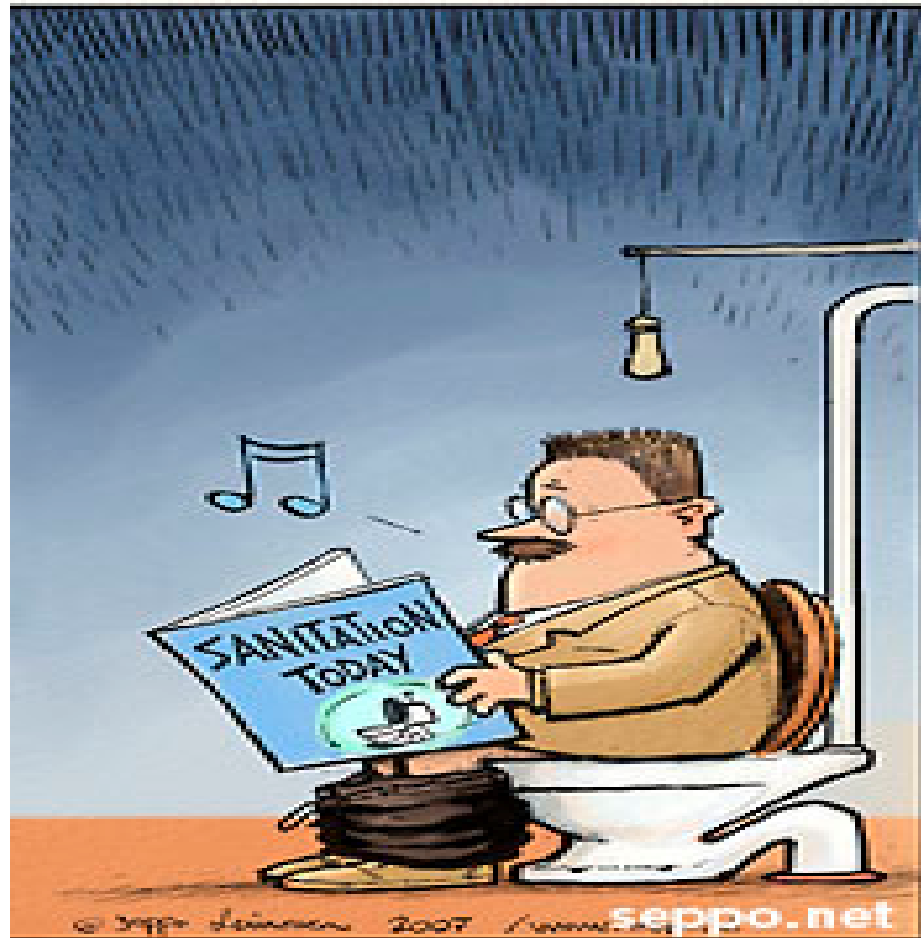
- ❖ Community can contribute to improve the efficiency through following steps:
  - Checking the growth of weed and vegetation;
  - Periodic Desilting of canals, channels etc.
  - Helping authorities in checking over-irrigation;
  - Creating awareness among farmers by adopting participatory Irrigation Management Practices.

# Facts to Know about Drinking water Management

- ❖ Know the facts below and ask questions:
  - Safe drinking water norm is 55 litre per capita per day within radius of 100 meters. Are you getting water as per this norm?
  - Time spent for collecting domestic water should be less than 30 minutes per day per household. Is this the case in your village?
  - Participation of the beneficiaries in water supply schemes is necessary from the conceptualization stage to the post-scheme completion management stages, including O&M. Is community participation there in your village water supply scheme?
  - Waste water management should be taken up by convergence with MNREGS, TSC, etc. Has any scheme for Waste water management been taken up in your village?



# SWIFT RELIEF FOR POOR WATER SUPPLY



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# Managing water Resources

- ❖ Community has every right to ask for a robust farmers and Water Users Education Programme.
- ❖ It has every right to ask the authorities to prepare the Water Budget, Water Use Plan and Water safety Plan for the village.
- ❖ It must demand the creation of a cadre of village volunteers – Jal Doots, on the pattern of Barefoot Hydrologists in Andhra Pradesh for efficient management of water resources.
- ❖ And it must assume the guardianship of its Wetlands.

# **PROTECTION AND MANAGEMENT OF WETLAND**

## MEANING OF WETALND

- Wetland, one of the crucial natural resources, are areas of land that are either temporarily or permanently covered by water.
- It includes not only (a) streams, (b) ponds, and (c) marshes, but also areas such as (d) wet meadows, (e) swamps, and (f) intermittent streams that may be dry for a significant portion of the year.
- The wetlands are of varying shape, size and depth; and locally called as beels, haors, jalah, doloni, hola, pitoni etc.

# ENVIRONMENTAL SIGNIFICANCE OF WETLANDS

Wetlands have great significance for more than one reason, most notably because they:

- Replenishes ground water;
- Conserve moisture of the land;
- Act as pollution filters;
- Harbours and support biological diversity;
- Helps in water storage and purification;
- Helps in flood control; and
- Protection against nutrient and sediment retention

## **ECONOMIC AND SOCIAL VALUE OF WETLANDS**

- fishery resources;
- irrigation;
- domestic consumption;
- bathing;
- provide livelihood to a number of local families;
- aesthetic enhancement of landscape;
- recreation sites near the beels; and
- tourism

## THREATS FACED BY WETLANDS

- Reclamation for agriculture and urbanization;
- Over-exploitation of fishery resources;
- Pollution from domestic and industrial waste;
- Pesticides and fertilizer fetched Agricultural run-off;
- Cultivation of the lake margins during dry seasons destroys large areas of aquatic vegetation; and
- Felling of Forests in the catchment area results in increased erosion which in turn causes rapid siltation in the beel.

# NEED TO PROTECT AND MANAGE WETLAND

- This loss results in
  - degraded water quality,
  - depleted fish and wildlife population,
  - reduces storage capacity leading to floods
  - Severity of floods.
  - Loss of soil moisture and health.



## MEASURES TO PROTECT WETLANDS

- No part of a beel be reclaimed for (i) agriculture, (ii) housing, and (iii) industrial purposes.
- Prohibition of (i) manufacturing or (ii) handling or (iii) storage or (iv) disposal of hazardous substances within the wetland area;
- Prohibition of Solid waste dumping;
- Pollution of beels by the release of domestic and industrial effluents be prevented;
- Beels be managed for their fishery resources;
- Prohibition of shooting and bird trapping; and
- Declaration as Bird Sanctuary;

## MEASURES TO PROTECT WETLANDS

- Maintaining upland buffer (A buffer is simply a strip of upland surrounding the wetland that is maintained in a natural vegetated state).
- Maintaining the vegetative buffer (or greenbelt) around the wetland.
- Adjacent buffer strips as open space.
- Permitted buffer zone for activities like collection of fodder etc.

## ROLE OF VLMCC FOR PROTECTION AND MANAGEMENT OF WETLAND

Task	Detailed Activity
Collection of information on past and present status of the wetlands	<ol style="list-style-type: none"><li data-bbox="546 488 1991 799">1. Apprising community of the <b>importance of wetland, threats and measures to protect wetlands.</b></li><li data-bbox="546 839 1991 1382">2. Interaction with senior and leading citizens to know the original nature of the wetland and tracing out its history to understand the nature of the threats.</li></ol>

# ROLE OF VLMCC AND COMMUNITY

Task	Detailed Activity
Steps to be taken by the VLMCC	<ul style="list-style-type: none"><li data-bbox="394 475 1742 531">☐ Organising awareness generation programmes by:<ul style="list-style-type: none"><li data-bbox="394 563 1659 619">▪ Taking up plantation around the upland buffer;</li><li data-bbox="394 651 1995 794">▪ Organising debates, poster competitions etc. in schools on the World water day;</li><li data-bbox="394 826 1704 882">▪ Mobilising public opinion against encroachment;</li><li data-bbox="394 914 1944 970">▪ Peaceful marches/protest against dumping of solid waste;</li><li data-bbox="394 1002 1995 1233">▪ sensitising the people in neighbourhood about harmful effects of the use of chemicals and pesticides in nearby fields or lawn.</li><li data-bbox="394 1265 1995 1409">▪ Organising community action to clear the wetland of harmful invasive weed.</li><li data-bbox="394 1441 1727 1497">▪ Banning of use of plastics in and around wetlands</li></ul></li></ul>

# Protecting Open Spaces and Community Land



# Understanding Open Spaces

- By open spaces we mean a variety of land masses that are accessible to community. These include, grasslands, grazing lands, parks, playgrounds etc.
- Their importance lies in the fact that as the residents of the mankind we have some shared needs that can be achieved only by the part of the planet owned and used collectively.
- Open spaces are also the places that we share with other forms of living species, plants, animals, birds, micro-organisms etc.
- And more importantly they are the best expression of our gratitude to the nature.

# Reasons we need Open Spaces

- ❖ Open spaces have several aesthetic, recreational, ecological, health, economic, social and cultural benefits.
- ❖ They contribute to the beauty of the landscape, so much so that empirical studies show that properties having open spaces in the vicinity fetch much higher prices.
- ❖ People enjoy viewing nature, spending time away from the built-up populated areas.
- ❖ Interacting with nature can have a restorative effect on attention/focus levels, through providing the brain a break from overstimulation.
- ❖ They contribute to positive attitudes and healthy habits, like walking, jogging, playing, physical exercises etc.

# Reasons We need Open Spaces

- ❖ Research shows that contact with the green environment still offers great benefits to mental health and psychological well-being.
- ❖ People living in areas with lot of open spaces are known to have had less health related problems like, headache, stress, anxiety, circulatory problems etc.
- ❖ Open spaces benefit communities by facilitating increasing levels of social contact and social integration.
- ❖ As a natural play environment it helps increases creative play, improves concentration and a feeling of self worth in children.
- ❖ Open spaces also serve as islands of nature, promoting biodiversity and providing a home for natural species in environments.



# Reasons We Should Protect the Natural Green Cover

- ❖ Trees contribute to their environment by providing oxygen, improving air quality, climate amelioration, conserving water, preserving soil, and supporting wildlife.
- ❖ One acre of forest absorbs six tons of carbon dioxide and puts out four tons of oxygen. This is enough to meet the annual needs of 18 people.
- ❖ Trees and shrubs also filter air by removing dust and absorbing other pollutants like carbon monoxide, sulphur dioxide and nitrogen dioxide.
- ❖ Trees control climate by moderating the effects of the sun, rain and wind.
- ❖ Leaves absorb and filter the sun's radiant energy, keeping things cool in summer.

# Reasons We should Protect the Green Cover



# Reasons We should Protect the Green Cover

- Trees also preserve warmth by providing a screen from harsh wind.
- In addition to influencing wind speed and direction, they shield us from the downfall of rain, sleet and hail.
- Trees also lower the air temperature and reduce the heat intensity of the greenhouse effect by maintaining low levels of carbon dioxide.
- Far reaching roots hold soil in place and fight erosion.
- Trees absorb and store rainwater which reduce runoff and sediment deposit after storms. This helps the ground water supply recharge, prevents the transport of chemicals into streams and prevents flooding.
- Fallen leaves make excellent compost that enriches soil.

# Reasons We should Protect the Green Cover

- Hundreds of living creatures call trees their home. They keep many animals, such as birds and squirrels, out of the reach of predators.
- Trees provide timber for building construction, furniture manufacture, tools, sporting equipment, and thousands of household items.
- Wood pulp is used to make paper.
- They are an important source of raw materials for making medicines and chemicals.

# Reasons We should Protect Our Grazing Lands

- Have you really pondered over following questions seriously:
  - Whose population is more in the village: of humans or cattle?
  - How much land is devoted to arranging food for the cattle?
  - What do we know about the quality of food of the cattle?
  - How many of us are economically well-off to arrange good feed for them from the market?
  - Have we taken good care of our grazing lands by protecting them from shrinking or disappearing or developing them as good source of fodder?

# Facts We should Know

- ❑ The livestock population, has two broad categories: (i) stall feeding based bovine livestock, and (ii) free grazing based livestock.
- ❑ Persons with the first category of livestock also need the support of pastures, but the second category of livestock belongs mainly to resource-starved households.
- ❑ The available data reveals that the present fodder availability in the country is well below requirement.
- ❑ The data also reveals that only about half of the annual fodder requirement is met from the cultivated fodder and crop residues, whereas open grazing and fodder availability from common property resources like forests, pastures, village commons, etc. fulfils the remaining half of the annual fodder requirement.
- ❑ As per estimates, the country's pastures have reduced from about 70 million ha in 1947 to just about 38 million ha in 1997.
- ❑ The remaining grazing lands have either already degraded or are in the process of degradation.

# Facts we should Know

- ❑ The once robust village level traditional institutions ensuring their sustainable management have broken down and there is no other agency to look after their management issue.
- ❑ There is lack of fodder banks and value addition facilities to handle and store surplus fodder during monsoons.
- ❑ Our livestock suffers from low productivity that is attributable to underfeeding.
- ❑ More than 50% of the cattle get less than half of what they need to eat.

# Let's Protect our Open Spaces and VGRs & PGRs

- ❖ Map and secure them by demarcating through green fencing, creating vegetative barriers, digging trenches etc.
- ❖ Study the kind of fodder and grass varieties that may grow easily and take up pasture development.
- ❖ Restore the traditional practice of growing and maintaining fodder trees/ bamboos/ grasses on farm bunds, to meet fodder requirements during winters. This will help ease the pressure on grazing lands and provide leaf fodder.
- ❖ Establish a network of nurseries in the state.
- ❖ Establish Fodder Storage Banks to meet the demand of fodder in lean periods.
- ❖ Build capacity of the community to take informed decisions and manage them better.



# Let's protect our Open spaces and VGRs and PGRs

- ❑ Mobilise villagers for peaceful protest on the patten of Chipko Andolan to resist the attempts of vested interests.
- ❑ Report the fact of encroachment to the Circle Officer as early as possible and not later than 12 hours of that. Circle Officer is duty bound to remove encroachment immediately.
- ❑ Diversion of VGR/PGR or de-reservation for any other purpose is barred by Hon'ble Supreme Court, except in exceptional cases and no de-reservation proposal can be forwarded by the Circle Officer without your recommendation.
- ❑ Extend all possible help in the mapping, demarcation and fencing of the Open Spaces in effective manner.

# Let's protect Our Open spaces and VGRs and PGRs

- Discuss with the villagers the fodder and grass varieties that can be grown to develop the VGR/PGR as a good pasture and share your recommendations with the Circle Officer and A. H. & veterinary Department officials.
- Discuss with the Agriculture and Forest Department officials the plant varieties that can be grown to develop agro-forestry around the VGRs/PGRs and also along the bunds and field boundaries.
- Develop unanimity regarding the way grazing can be regulated in the VGRs/PGRs to ensure optimum use.
- Discuss with the P.& R. D. Department officials and G.P. representative about development of playgrounds, parks etc. in the village.

# Protecting our Soil and Air



# Things to Do to Protect Soil

- ❖ Over-use of chemicals (fertilisers and pesticides) is not good for the soil health and environment.
- ❖ They are harmful in many ways:
  - Over 98% of sprayed insecticides and 95% of herbicides reach a destination other than their target species, because they are sprayed or spread across entire agricultural fields.
  - Pesticides can contribute to air pollution.
  - Pesticide use accounts for about 6 per cent of total tropospheric ozone levels.
  - Pesticides can eliminate some animals' essential food sources, causing the animals to relocate, change their diet or starve.

# Things to Do to Protect Soil

- Many of the chemicals used in pesticides are persistent soil contaminants, whose impact may endure for decades and adversely affect soil conservation.
- The use of pesticides decreases the general biodiversity in the soil.
- Pesticides have had harmful effects on growth and reproduction on earthworms.
- Some pesticides can bio-accumulate, or build up to toxic levels in the bodies of organisms that consume them over time.
- Pesticide surface runoff into rivers and streams can be highly lethal to aquatic life, sometimes killing all the fish in a particular stream.

# Things to Do to Protect Soil

- Pesticides have been linked to a wide range of human health hazards, ranging from short-term impacts such as headaches and nausea to chronic impacts like cancer, reproductive harm, and endocrine disruption.
- Pesticides can cause many types of cancer in humans. Some of the most prevalent forms include leukaemia, brain, bone, breast, ovarian, prostate, testicular and liver cancers.

# Things to Do to Protect Soil

- ❖ It is essential to revitalize the soil system through organic residues and materials.
- ❖ Soil nutrient management should be supplemented through various organic means, i.e. compost, vermi-compost, green manuring etc.
- ❖ Farmers are to be made aware of the techniques of conservation farming. Composting methods with high biomass-to-dung ratio should be targeted to overcome the limitation of availability of dung.
- ❖ Intensification of multi-purpose biomass in various places like stream banks, road sides, field bunds etc., should be promoted in addition to block plantations in common and private lands.

# Things to Do to Protect Soil

- Promote Organic farming. It includes:
  - encouraging predatory beneficial insects to control pests;
  - encouraging beneficial microorganisms,;
  - rotating crops to different locations from year to year to interrupt pest reproduction cycles,;
  - planting companion crops and pest-repelling plants that discourage or divert pests;
  - using row covers to protect crops during pest migration periods;
  - using biologic pesticides and herbicides;
  - Using physical barriers, such as row covers etc.



# What pollutes our Air

## ❑ Burning of Fossil Fuels:

- Sulphur dioxide emitted from the combustion of fossil fuels like coal, petroleum and other factory combustibles is one the major cause of air pollution.
- Pollution emitting from vehicles including trucks, jeeps, cars, trains, airplanes cause immense amount of pollution.
- Carbon Mono oxide caused by improper or incomplete combustion and generally emitted from vehicles is another major pollutant along with Nitrogen Oxides.

# What pollutes our air

## ❑ Agricultural activities:

- Ammonia is a very common by-product from agriculture related activities and is one of the most hazardous gases in the atmosphere.
- Use of insecticides, pesticides and fertilizers in agricultural activities has grown quite a lot. They emit harmful chemicals into the air and can also cause water pollution.

## ❑ Exhaust from factories and industries:

- Manufacturing industries release large amount of carbon monoxide, hydrocarbons, organic compounds, and chemicals into the air thereby depleting the quality of air.
- Petroleum refineries also release hydrocarbons and various other chemicals that pollute the air and also cause land pollution.

- ❑ Mining operations: During the process dust and chemicals are released in the air causing massive air pollution.

# What we can do

- Use energy efficient devices: CFL lights consume less electricity as against their
- Understand and promote the concept of Reduce, Reuse and Recycle: Do not throw away items that are of no use to you. In-fact reuse them for some other purpose.
- Reduce the use of chemical fertilisers and pesticides.
- Avoid using bio-mass as fuel for cooking purposes.
- Plant trees as they give off oxygen and work as windbreaks against spread of harmful particles in the air.

- ❖ According to the World Health Organization, there are as many deaths in the world due to air pollution as there are deaths due to car accidents.
- ❖ It is the main cause of ozone depletion, global warming and climate change.
- ❖ By taking a few simple steps as discussed we can contribute to the air quality in a major way.

Thanks